

NOTES ON CEYLON COCCIDÆ.

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ISCHNASPIS LONGIROSTRIS, Sign.

On *Graptophyllum hortensis*.

SCALE lepidosaphes-like, long, narrow, very dark brown in colour. Dorsal surface of pygidium of adult with a tessellated patch. Two pairs of lobes, median lobes about half their width apart, each lobe somewhat triangular and minutely serrated along the margin. Second lobe duplex, the mesal part much the larger, non-serrated, projecting almost as far caudad as do the median lobes, and with a chitinous band on each side running well into the pygidium. Third lobe and sometimes fourth may be slightly developed. Apex of pygidium slightly concave. Two short setæ between the median lobes, a seta, a plate, and a conspicuous pore-projection between the median and second lobes, a seta, a plate, and a pore-projection laterad of the second lobes, four plates (or five) on the pygidial margin, and six or seven plates on the two abdominal segments in front of the pygidium.

Circumgenital pores 2 (5 and 4) (2 and 2). On *Landolphia kirkii* specimens were seen with the circumgenital pores irregularly arranged in six groups of from two to five each—totalling seventeen.

On coffee pores were—3 (5 and 6) (2 and 2); 3 (5 and 5) (2 and 2). Insects, which were examined as soon as collected, contained larvæ in an advanced stage of development. An insect from leaves of coffee contained four large eggs as long as the breadth of the body, but lying in a slightly oblique position.

FROGATTIELLA PENICILLATA, Gr.

(= *Odonaspis penicillata*.)

J. B. N. H., Vol. XVI., p. 346.

The "hairs" of Green are in reality plates, of which there are six or seven. There are also 2 long setæ which reach as far caudad as do the plates. There is a seta just mesad of the second paraphyses and another at the anterior limit of the pygidium. A third pair of paraphyses was not visible in the insects examined. The body contained larvæ with mouth-setæ well developed. There are parastigmatic pores associated with the anterior spiracles. The pygidium and the lateral margins of the preceding segments are more highly chitinized than the rest of the pygidium. The anus is surrounded by a ring of chitin.

CHRYSOMPHALUS CISTULOIDES, Gr.

Ibid., p. 342.

I am not certain that Green is correct in his interpretation of the shape of the scale. Some look very like it, but though the ventral scale does stand up, I think there is also a tilt upwards in the dorsal scale. Many scales are quite without the erect part of the ventral scale. The clear canal-like area running cephalad from the margin of the pygidium to the anus is very conspicuous. There is a conspicuous broad plate truncate and notched at the apex laterad of the second and third lobes, and others may have been broken off.

Circumgenital pores 2 (4 and 2) ; 1 (4 and 4) ; those of each group in a row. The body contains larvæ with mouth-setæ developed.

CHIONASPIS (SUBCORTICALIS, Gr. ?).

Ibid., p. 351.

Under bark of *Artocarpus integrifolia*.

The secretion is very thin ; scale otherwise as in *C. subcorticalis*, Gr. Adult female elongated or with the pygidium somewhat retracted. In its pygidial characters the insect resembles *Chionaspis subcorticalis*, Gr. The median lobes, however, are closer together, while the second lobes are

distinct, though hyaline and duplex, each half being longer than broad; the dorsal pores are slightly fewer than are represented in Green's figure, there being six in place of nine in the second series, four in the posterior, and two in the anterior portion of the arch. There is a prominent pore-opening laterad of the median lobes and of the first plate. Plates 0, 1, 1, 1, 2.

The anterior spiracles possess a prominent group of small parastigmatic glands (*C. subcorticalis*, Gr., is said to have no such glands).

Circumgenital pores 5 (19 and 18) (24 and 27).

Anus located as in *C. subcorticalis*, Gr.

ASPIDIOTUS (CUCULUS, Gr. ?).

Ibid., p. 341.

Insect oval, not "long pyriform." The lobes very distinctly notched on each side, not "obscurely emarginate" (in his figure, however, Green represents the notches as very distinct); apex broadly rounded, the mesal and lateral notches at the same level. Laterad of the lobes some 8 or 9 long pectinæ; these are in a continuous series, as in *Morganella maskelli*, Ckll., not in two groups as in *A. cuculus*. No "distinct marginal prominence" between the groups, nor a "larger conical point" beyond the outer group. Pectinæ (two ?) between the lobes; all pectinæ frayed at apex. The anal orifice has a comparatively broad chitinous margin, as in Green's figure of *A. cuculus*. A small seta just laterad of median lobes, 2 or 3 longer setæ in region of the pectinæ, and 3 or 4 on the margin of the pygidium cephalad of the pectinæ. A clear dorsal pore in the pygidium cephalad of the base of each lobe, as in Green's figure of *A. cuculus*. Minute dorsal pores especially distinct in a row running cephalad from the lateral side of the median lobes.

On twigs of *Mesua ferrea*, Peradeniya.

Though this insect shows several points of difference from *A. cuculus*, Gr., I hesitate to consider it as a separate species, the more so as both occur on *Mesua ferrea*. The one may be a younger stage of the other.

PARLATORIA PERGANDII, var. PHYLLANTHI, Gr.

Ibid., p. 350.

On *Diospyros ebenum*. Colouration of scale as in type.

The fourth lobe on one side is lobe-like with faint serrations, on the other with distinctly deeper serrations, but still not pectina-like.

Circumgenital pores (6 and 5) (5 and 5).

DIASPIS BOISDUVALII, Sign.

Scale circular, exuviae more or less central ; grayish-white. Adult female but little longer than broad ; a conspicuous tubercle on margin of thorax on each side. Apex of pygidium deeply notched ; median lobes slightly divergent, narrowing towards apex, which is blunt, serrated on mesal edge, not markedly free at apex. There is a gland-pore and two short setae between the median lobes. There is a seta and a plate laterad of the lobes. A pore-projection, situated between the median and second lobes, projects as far caudad as does the apex of second lobes. Second lobe duplex, mesal half reaching further caudad than do the median lobes ; each half-rounded at apex with a slight lateral notch. Between second and third lobes a plate and a pore-projection. Third lobes duplex, slightly larger than second and of much the same shape. There is a seta on the lateral half of each of the second and third lobes. Laterad of third lobe is a plate and a duplex lobe-like projection ; then two short, stout, pointed plates, and a stout spinous projection followed by four similar plates. Similar plates occur on the two abdominal segments cephalad of the pygidium.

Circumgenital pores bunched, 8 (16 and 19) (14 and 14).

On leaf of Orchid, Peradeniya.

ASPIDIOTUS (ORIENTALIS, Newst. ?).

Asp. osbeckiæ, Gr. *Ibid.*, p. 47.

On leaves of *Limonia alata*. Antennal tubercle broader than long, with a short median projection and bearing a long seta laterally. Mesal lobes as in Green's figure. Second lobes much as in Green's figure, but the lateral notch is more distinctly caudad of the mesal. Third lobes almost as broad as second lobes and deeply notched on the lateral margin.

Pectinæ 2, 2, 3, and 3 beyond the third lobes, deeply divided at apex and scarcely projecting beyond the lobes. All the pectinæ laterad of the third lobes with *dictyospermie*-like processes; these processes bent towards the mesal lobes. Paraphyses indistinct, those on the mesal side of the median lobe being the most distinct. Anus large, about its own length from the apex of the pygidium. Interval between second and third lobes wider than between median and second lobes.

Circumgenital pores present (6 and 6) (5 and 6); (6 and 5) (4 and 4); (7 and ?) (5 and 4).

CHRYSOMPHALUS ROSSI, Mask.

Green, "Coccidæ of Ceylon," Pt. I., p. 45.

On leaves of *Cycas* sp.

The lobes are distinctly notched on the lateral margin, obscurely on mesal margin. The pectinæ appear as if united at the base. There are seven pairs of distinct paraphyses; a pair at the base of each lobe and a pair between the second and third lobes, one on each side. The second, fifth, and seventh paraphyses of each side the longest. Numerous finer paraphyses on the pygidial margin.

Circumgenital pores (9 and 8) (7 and 7); (13 and 13) (7 and 8).

The mouth-setæ and lobes of unborn young are distinct. The median lobes of the embryo are widely separated, longer than broad, convergent, serrated on lateral margin, slightly notched at apex on mesal side; two small pointed plates in the interval between them, also two setæ projecting cephalad and crossing. A second pair of lobes is present, longer than broad, notched on both margins.

AONIDIELLA (CHRYSOMPHALUS) AURANTII, Mask.

Ibid., p. 58.

On *Morus* sp.

The pygidium and one or two segments in front of the pygidium are less heavily chitinized than the rest of the body. The paraphyses are inconspicuous. The median lobes are distinctly larger than the second lobes. The second lobes may be without a notch on the mesal margin, resembling the third lobes in that respect.

PSEUDAONIDIA TRILOBITIFORMIS, Gr.

Ibid., p. 41.On *Peddeia africana*.

Antenna consists of a single long seta. Anterior parastigmatic pores 12. Median lobes more strongly chitinized than the others. Median lobes do not reach quite so far caudad as do the second lobes. All lobes except fourth rounded at apex and obscurely notched on each side near the apex ; the fourth notched on the lateral side only. Second and third lobes of much the same width and but slightly narrower than the median lobes.

Circumgenital pores (18 and 19) (15 and 18).

On *Ixora* sp.

Lobes narrowing towards the base, apices rounded. Median, second, and third lobes project almost equally far caudad.

Anterior parastigmatic pores 17-18. Circumgenital pores (30 and 25) (23 and 14). Adult female dark purple, tip of abdomen paler. Larvæ dark purple.

AONIDIA PERPLEXA, Gr.

J. B. N. H. Soc., Vol. XIII., p. 252.

Lobes of the second exuvium expanded caudally, the apex directed towards the meson ; apex on unbroken curve. Two pectinæ between the median lobes, two between the first and second and second and third lobes, and eleven laterad of the third lobes ; these eleven pectinæ produced into a long point and pectinate on the lateral margin.

ANTONINA sp.

Female very dark brown in colour, almost completely covered by loose white wax. Antennæ situated on the anterior margin, 2-jointed, the basal joint short, the terminal with about 7 hairs at its apex. Legs absent. Spiracles large, each with from 22 to 25 parastigmatic glands. Derm pores circular, of variable size. Derm covered with setæ. Apex of abdomen chitinized and bearing numerous derm pores and setæ. Anal ring with 6 stout setæ, which reach to the

posterior margin. Posterior margin slightly concave with large setæ on the edge of the concavity. Under the leaf-sheaths of *Panicum uncinatum* at Peradeniya.

MORGANELLA MASKELLI, Ckll.

(*Aspidiotus longispinus*, Morg.)

J. B. N. H. Soc., Vol. XVI., p. 340.

Antenna a low tubercle bearing several smaller tubercles, and at the base a long stout seta curved towards the middle line. On the cephalic margin between the level of the antennæ and placed close together are two stout setæ. Each lobe with two lateral notches, the proximal near the base and obscure, the distal very distinct. The lobes project into the pygidium as far as the anus, and the cephalic end of the projection may be knobbed. The pygidium is not markedly chitinized, though there may be several strands of chitin laterad of the vagina. The first pair of setæ laterad of the lobes are short and stout, the one more laterad the longer; the second pair may be similar in shape or long and slender and curved at the apex. The pectinæ are much more pectinate than in Green's figure, the fringe being present on both sides of the main shaft and projecting at right angles to the shaft. The first pair of setæ are separated from the lobes by at least two pectinæ. The larva is broadly oval and possesses a well-marked pair of lobes, which are somewhat convergent and project slightly into the pygidium. Each possesses three notches, one mesad and two laterad of the rounded apex. Between the lobes are two short stout setæ and two long setæ, one at the base of each lobe. Laterad of the lobes are several short setæ and a hyaline projection serrated at the apex.

An insect on *Morus* sp. contained in the posterior abdominal region a parasite with stout, sharply-hooked mandibles, and at the caudal end a tube continuous with the alimentary canal and apparently reaching to the outside of the scale insect, and containing small granular bodies. There were several parasites present, but only one had developed.

On *Cinnamomum zeylanica*, *Morus* sp., and *Brousonettia papyrifera*, in the last case buried in the bark.

AULACASPIS BARBERI, Gr.

M. D. A. I., Vol. II., No. 2, p. 35.

On *Loranthus* sp. growing on Avocada Pear, Peradeniya,
June 18, 1913.

Median lobes slightly divergent. Apex of mesal half of second lobe obliquely truncate, slightly incised; lateral half small and pointed. Third lobes present on one side, small, not duplex. Laterad of third lobes are several serrated projections, those associated with gland pores being large and prominent. Plates 1, 1, 1 or 2, 2, 3.

Circumgenital pores 8 (17 and 15) (17 and 17).

Two dorsal pores immediately laterad of the circumgenital pores.

On *Loranthus* sp. growing on *Cassia nodosa*, Peradeniya,
June 3, 1914.

Female scale on petiole. Secretion grayish-white, exuviae reddish-brown, situated just within margin. Scale highly convex.

Male scales in hundreds on under surface of same leaf. Exuviae yellowish-brown, secretion white, with faint median carina. Scales lying flat on leaf, the exuviae all pointing towards base of leaf. Antenna of adult female a tubercle bearing a short spine apically and a long seta laterally. Anterior spiracles with from 5 to 11 parastigmatic pores.

Three dorsal pores immediately laterad of circumgenital pores. Mesal half of second lobe dilated, rounded at apex; lateral half absent or small and pointed.

Circumgenital pores 6 (12 and 18) (24 and 25); 7 (20 and 16) (22 and 21); 10 (22 and 22) (22 and 20). Median circumgenital pores in a transverse row or in a bunch.

CRIOCOCCUS (ARAUCARIÆ, Mask. ?).

Larva, antenna with 7 segments, third longest. Body with a fringe of stout, conical, truncate spines on the dorsal side, and a fringe of slender pointed spines ventrally. Derm mamillated. Small pores and larger ring-like pores scattered over dorsum. Venter covered with slender setae and circular pores. Tarsi of first legs longer than tibiae, of almost the same length

as tibiæ in the second and third pairs. Anal ring with 8 setæ. Anal lobe with two shoulders near the base, each bearing a stout, conical, truncate spine; another lobe on mesal margin near apex also bearing a spine. A long seta on apex of lobe. Two large setæ and several smaller setæ on venter of anal lobes.

On *Araucaria cookii*, Peradeniya.

ASPIDIOTUS HEDERÆ, Vall.

On leaf of *Artocarpus integrifolia*, Peradeniya.

Scale circular, yellow, transparent. Mounted insect tapering rapidly towards the posterior end; pygidium small, the extreme apex rather suddenly truncated. The body contains yellowish eggs.

The median lobes are broader in comparison with their length than in *Aspidiotus transparens*, Gr. (Coccidæ of Ceylon, Pt. I., p. 49); they are rounded at the apex and distinctly notched on both sides, the mesal notch being caudad of the lateral. The second lobes are narrower than the median, longer than broad, rounded at apex, slightly notched on both sides. The third lobes are slightly narrower than the second, are longer than broad, rounded at apex, and notched on the lateral side. Laterad of the third lobes are about seven or eight short, broad pectinæ, deeply pectinate at apex, not so distinctly produced on the mesal side as in Green's figure of *A. transparens*, Gr. Dorsal pores in more or less regular rows running cephalad from the margin of the pygidium. Anus as in Green's figure of *A. transparens* as regards shape and position. Circumgenital pores (13 and 11) (9 and 10), those of each group in two more or less distinct longitudinal rows.

PROTOPULVINARIA LONGIVALVATA, Gr.

Coccidæ of Ceylon, Pt. IV., p. 254.

On *Gardenia latifolia*. In fresh specimens the dorsum is seen to bear wax-plates of the form of those in *Paralecanium expansum*, Gr. The marginal, dark-coloured zone is very distinct.

The eighth segment of the antenna is the longest, while the second is slightly longer than the third. The tarsus is shorter than the tibia, and in the first pair of legs is distinctly constricted distad of its middle. The marginal hairs are dilated at the base and apex and extend for half their length beyond the claw. Tarsal hairs long and knobbed at apex. Four small "fringe setæ," two on each side.

On Guava. Eighth segment of the antenna the longest, and the second is fully as long as the third.

PSEUDOPARLATORIA PARLATORIOIDES, Comst.

On leaves of Guava.

Scale circular, pale yellow, transparent; exuvia large, situated towards one side.

Three pairs of lobes. Median lobes well separated, each with sides parallel towards base; abruptly narrowed towards apex, which is rounded. Second and third lobes duplex, each part usually notched at least on the lateral side. There is a pair of short diverging plates united at base between the median lobes. There is a plate laterad of the median and second lobes and two small spinous processes on the margin of the pygidium cephalad of the third lobes. There is a prominent pore-opening laterad of the median, second, and third lobes, and a fourth on the base of the mesal half of the third lobe.

Anus conspicuus and not far from apex of pygidium.

Circumgenital pores (12 and 12) (7 and 8).

The pygidium of the second exuvium is very similar to that of the adult, except that the third pair of lobes is absent. The pygidium of the first exuvium bears a pair of minute hyaline lobes, widely separated and abruptly narrowed towards apex.

There is a stout plate laterad of each lobe and two or three similar plates more cephalad.

CHIONASPIS SIMPLEX, Gr.

Coccidæ of Ceylon, Pt. II., p. 160.

Underneath leaf sheaths of small bamboo (? *Dendrocalamus* sp.) at Peradeniya. Pygidium without lobes, asymmetrical, with small crenulations only and a few short setæ.

Pores of exterior spiracles 6-8, of posterior none. Antenna a tubercle bearing two setæ. Anal opening situated just cephalad of the anterior group of circumgenital pores, the vagina at the level of the interval between the cephalo-lateral and caudo-lateral groups of circumgenital pores. Numerous small glands opening on pygidium. Numerous curved striæ all over body. Chitinous bands run cephalad from the apex of the pygidium.

Circumgenital pores in five compact groups, 23 (30 and 39) (37 and 47).

This insect resembles Green's insect from Mauritius, which, he states, resembles in every way, except in number of groups of circumgenital pores, his *C. simplex*. Green may have colonized this insect at Peradeniya.

CHIONASPIS HERBÆ, Gr.

Under leaf sheaths of *Panicum* sp.

The median lobes are sunk in a slight cleft, and are finely but distinctly serrated on the mesal margin.

The number of circumgenital pores in the specimen I have seen is fewer than that given by Green; 17 (27 and 30) (30 and 25); 15 (29 and 32) (27 and 30); 14 (33 and 38) (31 and 33).

The antenna is a tubercle bearing a single seta.

FIORINIA FIORINLÆ, Targ. Tozz., Green.

Coccidæ of Ceylon, Pt. I., p. 94.

Male. Scale white, with a slight median carina sometimes visible towards the posterior end. Exuvium yellowish-brown. Scale surrounded by powdery wax.

On *Cupressus* sp.

The antennæ of the female are very variable in shape and size; generally they consist of a broad, sometimes quadrangular, tubercle, rounded, pointed, or notched at the apex, and bearing a stout curved seta near the base. I have never seen them showing the regularity represented in Green's figure. Anterior spiracles with about 5 parastigmatic pores.

The marginal abdominal tubercles are blunt at apex (on *Turpinia* sp.).

The median lobes are situated in a cleft, narrow, tapering, strongly divergent, pointed, distinctly free at apex and serrated along the mesal margin and at the apex.

The second lobes are duplex. The mesal half may be almost twice as broad as the lateral half, which may be well developed or minute (*Turpinia*); the mesal half may project caudally as far as the apex of the median lobes and may be slightly serrated on the lateral margin (Avocado Pear). Both halves are usually rounded at the apex.

There are two short setæ between the median lobes, a seta on the lateral side of the median lobes, a seta and a plate laterad of the median lobes. Thereafter in succession a prominent gland-pore, the second lobe with a seta on the base of its lateral half, a long plate broad at the base and abruptly narrowed thereafter, a prominent gland-pore, and three more gland-pores at intervals on the margin of the pygidium, the most anterior small, a seta being associated with the first of the three, and another lying near the third. No plates visible cephalad of the one laterad of the second lobes (*Cupressus* sp.).

In an insect from *Turpinia* sp. the setæ between the median lobes project beyond the lobes.

The number of gland pores on the pygidium is variable, though four appears to be the rule. In an insect from Avocado Pear only three could be made out on each side, one laterad of the median lobes, one laterad of the second lobes, and one slightly caudad of the level of the posterior end of the caudo-lateral group of circumgenital pores; and on one side the last-mentioned pore was either absent or so much reduced as to be unrecognizable as such.

In an insect from *Walsura piscidia* there was a plate cephalad of the third gland-pore and having a seta mesad of it.

Circumgenital pores. Median in a distinct group: 8 (9 and 5) (13 and 15), *Walsura*. Median group distinctly isolated: 3 (12 and 11) (11 and 13); 2 of the 11 of the posterior group situated midway between the anterior and the posterior groups (*Turpinia*). Median group of 8 in a double transverse row: Host?

Median and anterior-lateral groups practically in a continuous arch, 5 (9 and 10) (13 and 13); 6 (9 and 8) (12 and 12);

Eugenia sp. Pores practically in a continuous arch : 7 (9 and 7) (12 and 12) ; 5 (11 and 9) (11 and 12) ; 6 (6 and 6) (5 and 10). Avocado Pear.

Median group distinct or continuous with the anterior groups ; anterior and posterior groups massed or separated. A median group showed 7 pores partly in a single and partly in a double transverse row. *Cupressus*.

Anus just caudad of the median group of circumgenital pores. Vagina in a line between the break in the lateral groups of circumgenital pores. (*Turpinia*.)

The second exuvium may have both halves of the second lobe well developed, and laterad of the second lobe is the lobe-like projection of a gland-pore. Laterad of this is a series of 4 or 5 serrated projections and still farther laterad 2 short plates. There are at least 5 gland-pores opening on the margin of the pygidium. There is a prominent seta on the lateral half of the second lobe. (*Turpinia*.)

Larva with two chitinous processes meso-caudad of the base of the antenna (*Eugenia*). In the larval exuvium two clear areas in corresponding position (Host ?).

Larva with two setæ projecting cephalad between the antenna.

Apex of the pygidium with 2 minute, widely-separated lobes, and laterad of these two long plates, the one more caudad the larger.

There are several small setæ between the lobes, and two situated cephalo-mesally of the base of the lobes and convergent caudally. (*Eugenia* sp.)